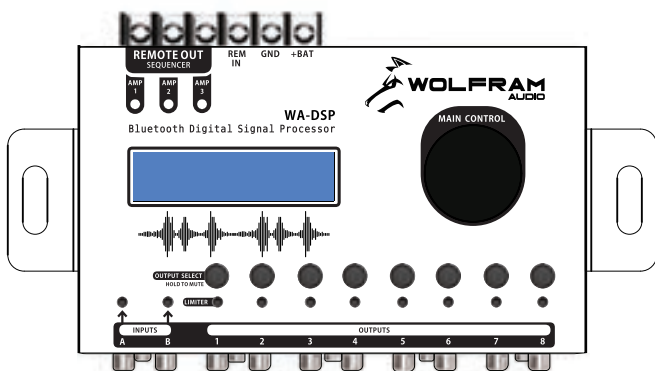




WA-DSP

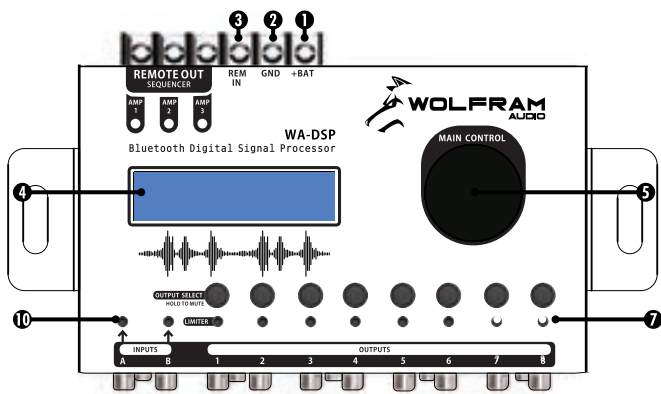
Bluetooth Digital Signal Processor

User's Guide

• INTRODUCTION

The **WA-DSP** is a digital audio processor that offers an enormous variety of high accuracy settings and configurations for improving your audio system's performance. It is composed of two DSP's (Digital Sound Processors) that provide real-time equalizing, filtering, balancing, gain, phase inversion, limiting, and digital output and input routing among other treatments.

• OVERVIEW:



1 - (+ BAT): For the positive charging source, connect the terminal to the positive pole of the battery (+12 V) using, at minimum, a cable with a gauge of 2.5 mm² (AWG 13). Use of an external protection fuse (1A) is highly recommended.

2 - GND: The negative (ground) must be connected to the vehicle chassis by a cable with a gauge of at least 2.5 mm².

3 - REM : Automatic activation may be connected to the output of the power antenna for the CD/DVD/MP3 player via 0.5 mm² gauge cable (AWG 20).

4 - DISPLAY: LCD display.

5 - MAIN CONTROL: navigation interface, settings adjustment, "Enter" (quick press), "Return" (hold).

6 - OUTPUT SELECT : Quick press will pull up shortcut keys configuring output channels when changing settings. HOLD will turn specific output channels on or off. Blue light - channel output on. Red light - channel output off.

7 - LEDS LIMITER: The LEDs will light when the "Limiter" of the channel in question is acting, they are also used as indicators of output saturation.

8 - INPUTS: Individual A and B inputs.

9 - OUTPUTS: 1 to 8 individual outputs.

10 - MAXIMUM LEDS INPUT SIGNAL: The LEDs will light indicating that the respective input signal has reached the maximum level allowed.

• BEFORE INSTALLING

Read this manual carefully before installing the **WA-DSP** digital audio processor. The instructions for installation and connections must be followed precisely. If necessary, contact our Customer Service.

All battery connections (power feed), inputs and outputs can be set up easily and safely using the power and RCA connectors.

The **WA-DSP 's auto turn on signal should be the same as that of the amplifiers or it should be sequenced as follows:**

****WA-DSP** switches on first, then **WA-DSP** switches off after the amplifiers.**

1) To avoid damaging the cables, make sure that they are not installed across sharp metal edges.

2) Keep all cables as far as possible from the ignition, ignition cables and electronic fuel injection modules, since they may cause sound interference.

3) Keep the length of RCA cables as short as possible. It is best to use long power cords and decrease the length of RCA cables.

• RESOURCES

The **WA-DSP** has 2 independent inputs and 8 outputs, and the following functions:

- Graphic input equalizer (15 bands and equalization presets);
- Parametric input equalizer (frequency, gain, Q factor);
- Parametric equalizer per output (frequency, gain, Q factor);
- Routing between inputs and outputs;
- High precision crossover with Butterworth and Linkwitz-Riley filters and attenuations up to 48 dB / 8th;
- High precision alignment / delay;
- Phase inversion;
- Limiter with Threshold, Attack and Release adjustment;
- Independent gain and mute per output and master volume;
- Working memory with automatic saving of settings;
- Allows you to save and load the settings made by the user;
- Security password to block parameter modification;
- Frequency generator, frequency sweep and pink noise generator;
- Screen saver with rotating text.

NAVIGATION AND CONTROL

Navigation and control of the WA-DSP are made via the "MAIN CONTROL" knob and the "OUTPUT SELECTS" hotkeys.

MAIN CONTROL

Rotation: NAVIGATION/INCREASE/DECREASE
Quick Press: ENTER/SELECT
Hold: RETURN

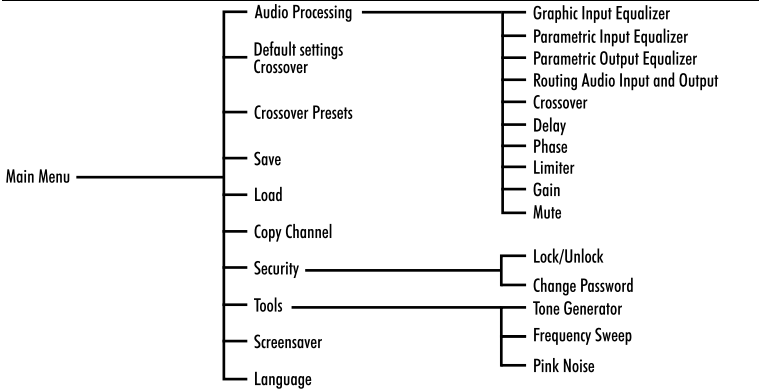


OUTPUT SELECTS

Quick press: SELECT CHANNEL
Hold: OUTPUT ON / OFF



• MAP OF SCREENS



• GRAPHIC INPUT EQUALIZER

The input graphic equalizer has 15 bands, allowing a variation of ± 12 dB per band, with a pitch of 0.1 dB, with frequencies equally spaced in 2/3 octave, in the range of 25 to 16 kHz in accordance with ISO requirements. The graphic equalizer acts on the two inputs simultaneously.

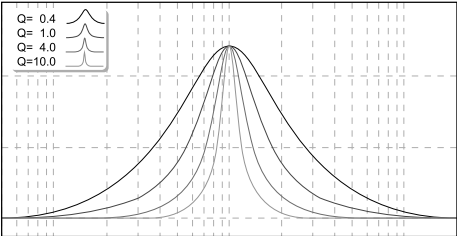
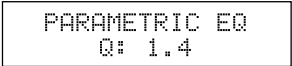
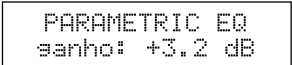
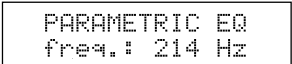


The WA-DSP comes with 12 graphic equalizer presets: FLAT, LOUDNESS, BASS BOOST, MID BASS, TREBLE BOOST, POWERFUL, ELECTRONIC, ROCK, HIP HOP, VOCAL, POP, and PANCADAO (heavy beat). These can be found under the "Graph EQ Presets" menu on the main screen.



• PARAMETRIC EQUALIZER

The parametric equalizer allows you to choose a gain / attenuation at a specific frequency, as well as the bandwidth of that equalizer by means of the Q factor, the smaller the Q the greater the width of that equalization band, affecting to a greater extent the neighboring frequencies. The WA-DSP has 9 parametric equalizers distributed as follows, 1 for the inputs and 8 for the outputs (1 for output).



• INPUT AND OUTPUT ROUTING

The purpose of the routing option allows you select the audio source A, B or A + B (sum) for each output. Turning the "MAIN CONTROL" dial moves the audio source to the selected route. To select another channel, quickly press the corresponding "OUTPUT SELECT".

ROUTING
IN A+B ----> OUT1

• CROSSOVER

The crossover function allows precision definition of the cutoff frequencies for the high-pass filter and the low-pass filter, as well as filter attenuations and topology individually by output.

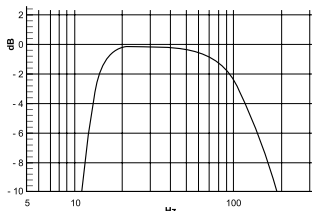
The available filters and attenuations are:

HPF: Butterworth 12/18/24/36/48 dB/8°
Linkwitz-Riley 12/18/24/36/48 dB/8°

LPF: Butterworth 12/18/24/36 dB/8°
Linkwitz-Riley 12/18/24/36 dB/8°

HPF OUT1
f: 12 Hz LR48

LPF OUT1
f: 107 Hz BT12



In the "CROSSOVER" screen, each setting in the "MAIN CONTROL" changes the parameter in editing, between output, filter type, frequency and attenuation / topology.

To select another output channel for editing you can also quickly press the OUTPUT SELECT "OUTPUT SELECT" of the corresponding output.

• BALANCE / DELAY

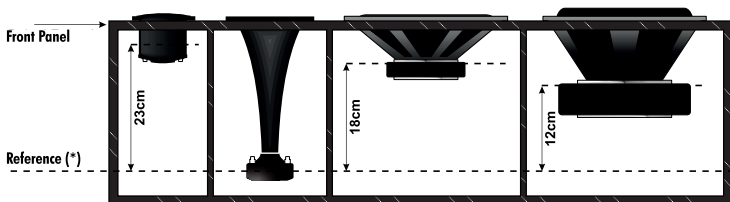
The Delay function allows for the digital alignment of transducers (speakers) via the time correction performed by the DSP, and ensures that the sound from all the speakers arrives at the listener with improved audio fidelity while avoiding frequency cancellations.

The adjustment can be carried out as follows:

DELAY OUT1
12.0cm 0.349ms

1. Identify the coil farthest from the listener or the front panel of the box. This coil will be used as a reference;

2. Measure the distance from the other coils to the reference coil. These are the distances used in configuring the delay of each output channel.



• PHASE

This function is used for resolving problems caused by canceling frequencies. From this screen you can reverse the phase of all outputs individually. Turning the "MAIN CONTROL" dial changes the phase (0° ou 180°) of the corresponding output. To select another channel, quickly press the corresponding "OUTPUT SELECT" shortcut.

PHASE
OUT1: 180

• LIMITER

To protect your amplifiers and speakers, the WA-DSP has a limiter with an integrated "Dynamic Attack-Release" system for each of the 4 outputs. Use this function to attenuate and prevent damage to the system caused by signal peaks.

The Threshold (-24 to 0dB) setting defines a threshold for the Limiter's activation: the Limiter kicks in when this threshold is exceeded.

The Attack parameter (0.1 to 100 ms) defines how fast the Limiter reacts / acts when the signal exceeds the Threshold.

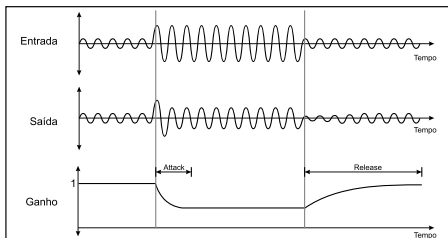
The Release parameter (1 to 1600 ms) controls the recovery time elapsed between the time the signal falls below the Threshold and deactivation of the Limiter.

In addition to manual adjustments of Attack and Release values, it is possible to enable the "AUTO" mode, where the Attack and Release parameters are controlled in real time by the "Dynamic Attack-Release" system, providing ideal conditions for sound fidelity

LIMITER
THRES.: -9.5 dB

LIMITER
ATTACK: 0.1 ms

LIMITER
RELEASE: 500 ms



• OUTPUT GAIN

This menu allows you to adjust the gains of the individual outputs within a range of -45 to +15 dB, as well as to increase the master volume of the WA-DSP from 0 to 100%.

MASTER LVL: 82%
OUT1 GAIN: +3dB

• ON/OFF OUTPUT (MUTE)

The outputs can be switched individually on and off quickly by holding down the OUTPUT SELECT that corresponds to the output. The LED color indicates the status of the output.

- BLUE: Output ON.
- RED: Output OFF (MUTE).

In the "MUTE" screen, you can still turn off and on all the output channels simultaneously using the "MAIN CONTROL" go to the output field and select "ALL-ENTER" or "ALL-ENTER ON". Then fast touch on "MAIN CONTROL". You can also turn the input graphic equalizer on or off.

OUT1: ON
GRAPH EQ: ON

MUTE ALL (ENTER)
GRAPH EQ: ON

ON ALL [ENTER]
GRAPH EQ: ON

• SAVE / LOAD / FACTORY RESET

The WA-DSP has four memory slots available for saving personalized settings, accessed via the "SAVE" function. Saved settings can be named with titles up to 15-characters long. Besides the memory space available to the user, there is autosave, where all parameters and settings are saved in a separate working memory. Or rather, if there is a drop in power or the product is turned off during configuration, the settings will not be lost. This function cannot be disabled.

SAVE SLOT1
8Channels_PRV->

LOAD
Default

FACTORY RESET
NO [YES]

To load previously saved settings use the "LOAD" function. This function also allows the factory presents to be loaded via the "DEFAULT" memory.

If you want to restore all of the WA-DSP's factory settings, simultaneously hold down the "OUTPUT SELECT" shortcut keys for outputs 1, 2 and 3 while turning on the device.

This procedure will erase all internal settings and saves.

• COPY CHANNEL

This function allows you to copy all audio settings from one output channel to another.

The copied functions are: parametric output equalizer, routing, crossover, alignment, phase inversion, limiter, gain and mute.

1. Select an "SOURCE" output channel using the "OUTPUT SELECT" hotkeys or by turning the "MAIN CONTROL", fasten "MAIN CONTROL";
2. Select a "DESTINATION" output channel using the "OUTPUT SELECT" shortcut keys or by turning the "MAIN CONTROL", fasten "MAIN CONTROL";
3. The confirmation message will appear. If confirmed, as output channels from "ORIGIN" to the "DESTINATION" output channel, overwriting as the "DESTINATION" output channel.

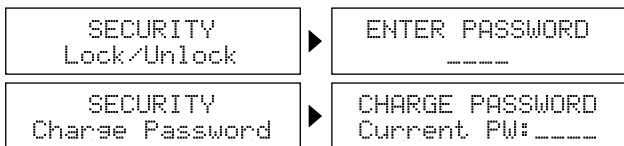
COPY CHANNEL
Source: OUT1

COPY CHANNEL
Destination: OUT2

COPY CHANNEL
NO [YES]

• SECURITY

This function locks the ability to edit the WA-DSP's settings, including blocking the save and load settings. Via the "SECURITY" menu you can lock, unlock ("LOCK/UNLOCK") and change the password ("Change Password"). On/off for output channels is not blocked. Default password: 1234.

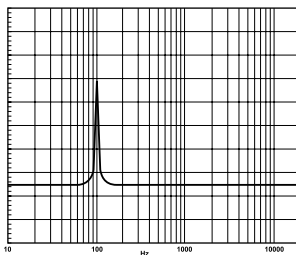
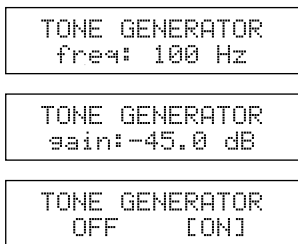


• TOOLS

The WA-DSP has tools to aid in the regulation of your sound system, TONE GENERATOR, FREQUENCY SWEEP and PINK NOISE GENERATOR. These tools are signal sources for all outputs, that is, during their use as inputs.

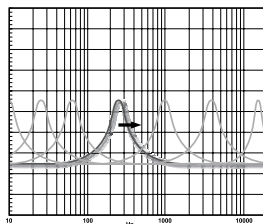
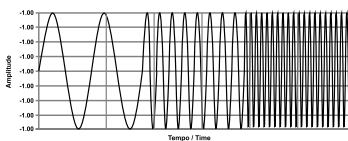
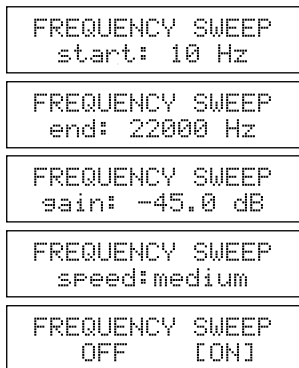
Tone Generator: Generate a specific frequency with gain control.

Each press on the "MAIN CONTROL" parameter is edited between frequency, gain and ON / OFF. With the generator on it is still possible to change the frequency and gain in real time, and even modify other audio parameters of the processor.



Frequency Sweep: Allows you to perform a frequency scan, with the option of selecting the initial and final frequency, gain, scanning speed and ON / OFF.

When activating the sweep enters a continuous cycle, to close it simply press any of the "OUTPUT SELECTS" or move the "MAIN CONTROL".



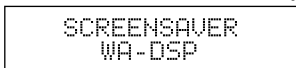
Pink Noise: Allows to generate a signal that maintains the same magnitude for the entire frequency range, generally used to calibrate audio systems in order to obtain flat response and due alignment between the tracks.

Each press on the "MAIN CONTROL" parameter in editing is changed between gain and ON / OFF. With the pink noise on it is still possible to change the gain of noise in real time, and even modify other audio parameters of the processor.



• SCREENSAVER

The WA-DSP has a screensaver function, which allows the user to define a 15-character scrolling text.

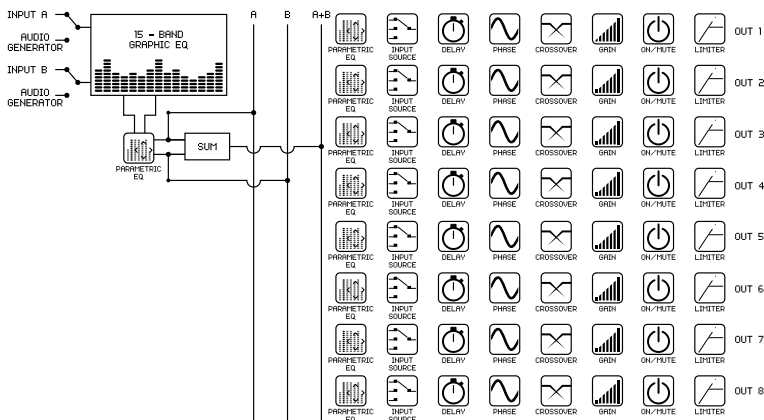


• LANGUAGE

You can select from the following operating languages: English, Spanish and Portuguese.

LANGUAGE
<< ENGLISH >>

• FUNCTIONAL DIAGRAM



TECHNICAL SPECIFICATIONS

Number of Input Channels:	2
Number of Output Channels:	8
Graphic Equalizer:	15 Bands, gain ± 12 dB
Graphic Equalization Presets:	12
Parametric Equalizer:	1 Input + 1 per Output, Gain ± 12 dB, Q Factor 0.4 to 10.0
Crossover with Variable Frequency:	Butterworth 12/18/24/36/48 dB / 8th - Linkwitz-Riley 12/18/24/36/48 dB / 8th
Crossover Presets:	11
Routing between Inputs and Outputs:	A, B or A + B
Alignment:	0 to 8ms (275cm)
Phase Inversion:	0° or 180°
Limiter:	Threshold -24 to 0dB / Attack 0.1 to 100.0ms Release 1 at 1600ms / Attack / Release - Manual or Automatic
Output Gain:	-45 to + 15dB
Master Level:	0 to 100%
Memory Positions Save / Load:	Working memory (autosave) + 4 memory positions
Copy of Channels:	Copy settings between output channels
Safety:	4-digit security password
Frequency Generator:	10Hz to 22kHz, Level -60 to 0dB
Frequency Sweep:	Freq. Start and end 10Hz at 22kHz / Level -60 to 0dB / Speed control
Pink Noise Generator:	10Hz to 22kHz, Level -60 to 0dB
Screensaver:	Editable text with 15 positions
Languages:	Portuguese, English and Spanish
Latency:	1.08ms
Input Impedance:	10 k Ω
Output Impedance:	47 Ω
Max Input Voltage:	5.6 Vpp (+ 8.2 dBu)
Max Output Voltage:	5.6 Vpp (+ 8.2 dBu)
Input Saturation Indicator:	1 per Entry
Output Saturation Indicator:	1 per Output (with Limiter link)
Signal-to-noise ratio:	> 90dB
Total Harmonic Distortion (T.H.D):	< 0.01%
Channel Separation:	> 80dB
Frequency Response:	10Hz @ 22.5kHz @ -1dB
Power supply:	10V to 15V DC
Max Current Consumption:	450mA @ 12.6V DC
Dimensions (W x H x D):	37 x 200 x 101 mm
Weight:	460g